United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

In Reply Refer To: MS 5410

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NMFS-SERO
ST. PETERSBURG, FL.

Dr. Andrew J. Kemmerer
Southeast Region
National Marine Fisheries Service
9721 Executive Center Drive
St. Petersburg, Florida 33707

Dear Dr. Kemmerer:

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agency consultation on any activity that may adversely affect Essential Fish Habitat (EFH). Implementing regulations at 50 CFR 600.920(a)(2)(ii) provide for consultation to be conducted programmatically when the National Marine Fisheries Service (NMFS) determines that adverse effects on EFH can be addressed for all projects at a program level. Programmatic consultations provide a mechanism to minimize or reduce the need for numerous project specific consultations.

By this letter, the Minerals Management Service (MMS) wishes to initiate a programmatic consultation for a variety of petroleum development activities in the Western and Central Planning Areas of the Gulf of Mexico. This consultation request specifically addresses pipeline rights-of-way, plans for exploration and production, and platform removal on the federal Outer Continental Shelf. In support of this request, I have enclosed our EFH assessment which describes the nature of the programs subject to this request, an analysis of the effects of consultation-related activities on EFH, views of the MMS regarding those effects, and identification of existing measures to mitigate potential adverse impacts.

We request your review of the enclosed documentation and a determination by the NMFS that EFH concerns and issues for the identified activities can be addressed at the programmatic level. Should you have recommendations to further avoid or minimize impacts to EFH, please notify us in writing.

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

# of pages ▶ 28

To J. Jackson
From R.E.P.
Dept./Agency NMFS-Galv.
Phone #
Fax #
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NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

We look forward to your positive response to this request. If you have any questions or wish to discuss specific issues, please contact Dr. Ann S. Bull at (504) 736-2794 or Mr. Greg Bolan at (504) 736-2740.

Sincerely,

Chris C. Oynes

Chris C. Oynes
Regional Director

Enclosure

Essential Fish Habitat (EFH) Assessment for the Minerals Management Service Programmatic Consultation for Gulf of Mexico Outer Continental Shelf (OCS) Oil and Gas Activities

This essential fish habitat (EFH) assessment satisfies the requirements of the interim final rule (50 CFR 600; FR 12/19/97 Vol. 62, No. 244, Pp. 66531-66559) for implementing the EFH provisions of the Magnuson-Stevens Fishery and Conservation Management Act. According to 50 CFR 600.920(g), Federal agencies must provide the National Marine Fisheries Service (NMFS) with a written assessment of the effects of any proposed actions that may adversely affect EFH. This assessment contains the following mandatory contents:

I. Description of the Proposed Action(s)
II. Analysis of the Effects (Including Cumulative Effects of the Proposed Action on EFH)
III. MMS's Views of the Effects of the Proposed Action on EFH
IV. Mitigation Measures

The information in this assessment comes from the Final Environmental Impact Statement (EIS) for Gulf of Mexico (GOM) OCS Oil and Gas Lease Sales 169, 172, 175, 178, and 182 in the Central Planning Area (USDOI, MMS, 1997) and the Final EIS for Gulf of Mexico OCS Oil and Gas Lease Sales 171, 174, 177, and 180 in the Western Planning Area (USDOI, MMS, 1998).

I. Description of the Proposed Action

The Outer Continental Shelf Lands Act (OCSLA) of 1953 (67 Stat. 462), as amended (43 U.S.C. 1331 *et seq.* (1988)), established Federal jurisdiction over submerged lands on the Outer Continental Shelf (OCS) seaward of the State boundaries. Under the OCSLA, the Department of the Interior (DOI) is required to manage the leasing, exploration, development, and production of oil and gas resources on the Federal OCS. The Secretary of the Interior (Secretary) oversees the OCSLA oil and gas program and is required to balance orderly resource development with protection of the human, marine, and coastal environments while simultaneously ensuring that the public receives an equitable return for these resources and that free-market competition is maintained. The OCSLA empowers the Secretary to grant leases to the highest qualified responsible bidder(s) on the basis of sealed competitive bids and to formulate such regulations as necessary to carry out the provisions of the OCSLA. The Secretary has designated the MMS as the administrative agency responsible for the mineral leasing of submerged OCS lands and for the supervision of offshore operations after lease issuance.

For purposes of this EFH assessment, the proposed action(s) is any activity associated with oil and gas development and production. The life of the leases resulting from a typical lease sale is assumed to be 35 years. Exploratory activity takes place over a 2- to 5-year period, beginning in the year of the sale. Development activity takes place over a 29-year period, beginning with the installation of the first production platform and ending with the drilling of the last development wells. Production of oil and gas begins by the second year after a proposed action and continues

through the 34th year. Final abandonment and removal activities occur in the last year of the life of a typical lease.

In the Gulf of Mexico OCS, the MMS OCSLA program is evaluated according to the National Environmental Policy Act (NEPA) guidelines. The purpose of the EIS's is to evaluate the proposed Federal actions for the proposed lease areas that may contain economically recoverable oil and gas reserves. These EIS's analyze and discuss the potential impacts of lease sales and subsequent activities on the marine, coastal, and human environments.

General summaries of activities are described below. Considerable detail for specific operations and lease sale time periods can be found in MMS lease sale EIS's (USDOI, MMS, 1997 and 1998) between pages IV-6 and IV-40 (USDOI, MMS, 1997; similar for USDOI, MMS, 1998). These documents are widely disseminated and readily available at institutions and libraries.

Oil and gas operations in the GOM are accomplished by structures placed or anchored or the OCS to facilitate oil and gas exploration, development, and production that include drilling ships (jack-ups, semisubmersibles, and drillships), production platforms, and pipelines. Such structure placement disturbs some area of the bottom directly beneath the structure. If anchors are deployed, the bottom habitat (immediately under the anchors and about one-third of the anchor chain) is directly impacted. Exploration rigs, platforms, and pipelaying barges use an array of eight 9,000-kg anchors and very heavy chain to both position a rig and barge, and to move a barge along the pipeline route. These anchors and chains are continually moved as a pipelaying operation proceeds. The area actually affected by anchors and chains depend on water depth, wind, currents, chain length, and the size of the anchor and chain.

Conventional, fixed multileg platforms, which are anchored into the seafloor by steel pilings, predominate in water depths less than 400 m. During structure removal, explosives are used to sever conductors and pilings because of the strongly over-built condition of these structures that must withstand probable hurricane conditions over an average 20-year span. Possible injury to biota from explosive use extends outward up to 900 m from the detonation source and upwards to the surface.

Major operational wastes generated in the largest quantities by offshore oil and gas exploration and development include drilling fluids and cuttings, and produced waters. Other major wastes include the following: from drilling--waste chemicals, fracturing and acidifying fluids, and well completion and workover fluids; from production--produced sand, deck drainage, and miscellaneous well fluids (cement, blowout preventer fluid); and from other sources--sanitary and domestic wastes, gas and oil processing wastes, ballast water, storage displacement water, and miscellaneous minor discharges.

Major contaminants or chemical properties of concern in oil and gas operational wastes can include high salinity, low pH, high biological and chemical oxygen demand, suspended solids, heavy metals, crude oil compounds, organic acids, priority pollutants, and radionuclides. Any and all of these contaminants and properties can lead to direct loss and/or harmful effects on managed species, including prey species, and the associated inshore, nearshore, and offshore EFH.

II. Analysis of the Effects

This EFH assessment section will begin with brief descriptions of affected areas and an overview of managed species. Analysis of the effects and also the following section, "MMS's Views of the

Effects of the Proposed Action on EFH," will be presented in three sections: Fisheries Impacts, Water Quality Impacts (coastal and marine), and Sensitive Offshore Resources (topographic features and live bottoms).

In keeping with the request by NOAA in the EFH Interim Final Rule to consolidate this EFH assessment with other environmental review procedures (NEPA), MMS's EIS for GOM Lease Sales 169, 172, 175, 178 and 182 in the Central Planning Area (USDOI, MMS, 1997) will be referenced for the bulk of analysis information. The bulk of this document is reduced by some 70 percent while retaining significant summary information from the NEPA document. It will be cited as "CPA" in the following text with page numbers. Literature references are also left within this source NEPA document. As stated in the Interim Final Rule, page 66556, "If the EFH Assessment is contained in another document, that section of the document must be clearly identified as the EFH Assessment." The EIS for the Western Planning Area (WPA) (USDOI, MMS, 1998) contains nearly exactly the same material as does the CPA and could also be used as a reference document with slight page number differences. Some variations occur, e.g., there are no pinnacles in the WPA.

Affected Areas

The EFH determination is based on species distribution maps and habitat association tables presented in Section 5 of the Amendment (GMFMC, 1998). In estuaries, the EFH of each species consists of those areas depicted in the maps as "common," "abundant," and "highly abundant." In offshore areas, EFH consists of those areas depicted as "adult areas," "spawning areas," and "nursery areas." Because these species collectively occur in all estuarine and marine habitats of the GOM, EFH is separated into estuarine and marine components. For the estuarine component, EFH is described and identified as all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), including the subtidal vegetation (seagrasses and algae) and adjacent intertidal vegetation (marshes and mangroves). In marine waters of the GOM, EFH is described and identified as all marine waters and substrates (mud, sand, shell, rock, hard bottom, and associated biological communities) from the shoreline to the seaward limit of the EEZ. CPA Section III.B.1. in the Central and Western Planning Areas lease sale EIS's (USDOI, MMS, 1997 and 1998) details coastal areas that are considered EFH, including wetlands and areas of submerged vegetation. CPA Section III.B.2. describes offshore areas that are considered EFH, including sensitive biological features (live-bottom formations and topographic features), followed by descriptions of their biotic assemblages.

Managed Species

The Gulf of Mexico Fishery Management Council (GMFMC) currently describes fishery management plans (FMP's) for a total of 26 representative species. These species or species complexes are shrimp (brown, pink, royal red, and white), red drum, reef fish (red, gag, black, and scamp grouper; red, gray, vermillion, yellowtail and lane snapper; greater and lesser amberjack; and tilefish); coastal migratory pelagic species (king and Spanish mackerel, bluefish, little tunny, cobia, and dolphin); gray triggerfish, stone crab, spiny lobster and the coral complex. None of the stocks managed by the GMFMC are endangered or threatened. Detailed species accounts, including

presentations of species abundance, life histories, and habitat associations for all life history stages, are presented in the generic Amendment for Essential Fish Habitat by the GMFMC (1998).

Tuna, billfish, swordfish, and sharks are under the direct management of NMFS and not included as Fishery Management Council managed species. The EFH areas for these highly migratory species (HMS) are described in separate FMP's, including the FMP for Atlantic tunas, swordfish, and sharks (U.S. Dept. of Commerce, 1998a) and the Atlantic billfish FMP Amendment 1 (U.S. Dept. of Commerce, 1998b). These separately managed species include albacore tuna, bigeye tuna, bluefin tuna, skipjack tuna, yellowfin tuna, swordfish, a suite of 32 shark species, and the billfish species including the blue marlin, white marlin, sailfish, and longbill spearfish.

Additional detailed descriptions of fisheries resources are also described in USDOI, MMS (1997 and 1998) within CPA Section III (pages 46-49) and will not be repeated here.

Fisheries Impacts

The major impact-producing factors that could affect EFH are as follows:

- coastal environmental degradation;
- marine environmental degradation;
- geological and geophysical surveys;
- petroleum spills;
- blowouts, pipeline trenching, and resuspension of sediments; and
- offshore discharges of drilling muds and produced waters.

Potential effects from these impact-producing factors are described below.

Wetlands and estuaries within the CPA and WPA may be degraded by OCS-related activities resulting from the proposed action. These include construction of new onshore facilities in wetland areas; pipeline placement in wetland areas; vessel usage of navigation channels and access canals; maintenance of navigation channels; inshore disposal of OCS-generated, oil-field wastes; and oil and chemical spills from both coastal and offshore OCS-support activities.

Water quality in coastal and estuarine areas adjacent to the CPA and WPA may be degraded by OCS-related activities resulting from the proposed action. These activities include construction of new onshore support facilities; routine point- and nonpoint-source discharges from inshore facilities; discharges from associated support vessel traffic; canal maintenance dredging and pipeline emplacement actions; inshore disposal of OCS-generated, oil-field wastes; oil and chemical spills from both coastal and offshore OCS support activities; and OCS-related trash and debris.

Water quality in offshore marine areas adjacent to the CPA and WPA may be degraded by OCS-related activities resulting from the proposed action. These activities include platform and pipeline installation, platform removal, the discharge of operational wastes, and OCS-related trash and debris.

The acoustical pulses used in seismic surveys generated by airguns have little effect on even the most sensitive fish eggs at distances of 5 m from the pulses. In general, the acoustical pulses also have relatively little effect on marine invertebrates, presumably due to their lack of a swim bladder (CPA, page IV-150).

Chronic low-level pollution is a persistent and recurring event resulting in frequent but nonfatal physiological irritation to those resources that lie within the range of impact and that are likely to be adversely affected by the pollution. Adult fish must experience continual exposure to relatively high levels of hydrocarbons over several months before secondary toxicological compounds that represent biological harm are detected in the liver (CPA with references, page IV-150).

The direct effects of spilled oil on fish occur through the ingestion of oil or oiled prey, through the uptake of dissolved petroleum products through the gills and epithelium by adults and juveniles, and through death of eggs and decreased survival of larvae. The effects on and the extent of damage from an oil spill to Gulf commercial fisheries is restricted by time and location. A discussion of the impact of oil on adult fish, eggs, and larvae appears on CPA pages IV-150 and IV-151. There is no evidence at this time that commercial fisheries in the Gulf have been adversely affected on a regional population level by spills or chronic oiling.

Observations at oil spills around the world consistently indicate that free-swimming fish are rarely at risk from oil spills. Fish swim away from spilled oil, and this behavior explains why there has never been a commercially important fish-kill on record following an oil spill. Large numbers of fish eggs and larvae have been killed by oil spills. However, fish over-produce eggs on an enormous scale and the overwhelming majority of them die at an early stage, generally as food for predators.

Benthic disturbance from subsurface blowouts of both oil and natural gas wells and trenching (burial) of pipelines in water depths less than 61 m may be detrimental to commercial fisheries. Trenching and blowouts can resuspend sediments, and the loss of oil-well control can release varying amounts of hydrocarbons into the water column. Detailed discussion can be found on CPA pages IV-151 and IV-152.

Drilling muds contain materials toxic to commercial fishery resources; however, the plume disperses rapidly and is usually undetectable at distances greater than 1,000 m (CPA, page IV-152). No effects beyond 100 m are expected.

In addition to toxic trace elements and hydrocarbons in produced waters, there are additional components and properties, such as hypersalinity and organic acids, that have a potential to adversely affect fishery resources. Produced waters that are discharged offshore are diluted, dispersed, and undetectable at a distance of 1,000 m from the discharge point; no detectable effects on water column organisms are encountered (CPA, page IV-152). Additional detailed analyses on the above impact-producing factors appear on CPA pages IV-152 through IV-154.

Cumulative Effects

A cumulative analysis is detailed on CPA pages IV-235 through IV-238 and considers commercial fishing activity, the status of commercial fishery stocks, the effects of impact-producing factors related to the Gulf OCS Program (proposed action and prior and future OCS sales), State oil and gas activity, and crude oil imports by tanker. Specific types of impact-producing factors considered in the analysis include commercial fishing techniques or practices, emplacement of production platforms, underwater OCS obstructions, production platform removals, seismic surveys, oil spills, subsurface blowouts, pipeline trenching, and offshore discharges of drilling muds and produced waters.

The effect of the OCS Program and non-OCS activities on wetlands and coastal water quality in the CPA is analyzed in detail in CPA Sections IV.D.1.e.(1)(b) and (3)(a), respectively. The indirect effect on commercial fisheries is considered below. (Water quality is also addressed separately in following sections.)

To summarize cumulative effects on wetlands, it is clear that both natural and manmade forces contribute to the ongoing loss of fresh and estuarine marshes in States bordering the GOM. The highest landloss rate occurs in Louisiana. Impacts from residential, commercial, and agricultural and silvicultural developments are expected to continue in all coastal areas, especially in Louisiana and Alabama. Navigation and flood control projects will cause significant saltwater intrusion and movement of seagrass beds and oyster reefs inland in southeastern Louisiana. Construction of new pipeline canals, improper maintenance of existing pipeline canals, and concentrated oil from accidents will cause major long-term decreases in the vegetative productivity of wetlands within and immediately adjacent to the sites and will convert some of the affected area to open water. If spilled oil contacts seagrass beds, oil concentrations will be high enough to cause short-term dieback and general weakening of the associated faunal and floral communities. Both direct and indirect impacts from State onshore oil and gas activities are expected to occur as a result of dredging of new canals, maintenance and use of rig access canals and drill slips, and preparation of new well sites. The widening of existing pipeline canals and erosion from vessel wakes will continue and will result in the destruction of a significant amount of wetlands.

To summarize cumulative effects on coastal and estuarine water quality, there exists a wide variety of contaminant inputs into coastal waters bordering the GOM; however, the dominant pollution source is the large volume of water from the Mississippi River that enters the Gulf region after draining over two-thirds of the contiguous U.S. Major activities that have added to the contamination of Gulf coastal waters include the petrochemical industry, agriculture, forestry, urban expansion, extensive dredging operations, municipal and camp sewerage treatment processes, marinas and recreational boating, maritime shipping, and hydromodification activities. Adding to these sources, but not as significant, are large commercial waste disposal operations, livestock farming, manufacturing industry activities, nuclear power plant operations, and pulp and paper mills. Vessel traffic is likely to impact water quality through routine releases of bilge and ballast waters, chronic fuel and tank spills, trash, and domestic and sanitary discharges. Potential oil spills represent an acute significant impact to coastal waters as well as serving as a low-level, chronic source of petroleum contamination to regional coastal water quality.

It is expected that coastal environmental degradation from the OCS Program and non-OCS activities will affect commercial fishery resources. The impact of coastal degradation is expected to cause less than a 10-percent decrease in commercial fishery populations, in essential habitats, or in commercial fishing. Recovery of commercial fishery resources can occur from more than 90 percent, but not all, of the expected coastal environmental degradation. At the estimated level of effect, the resultant influence on Central Gulf fisheries is expected to be substantial and easily distinguished from effects due to natural population variations.

Oil spills that contact coastal bays, estuaries, and waters of the OCS when pelagic eggs and larvae are present have the greatest potential to affect commercial fishery resources. In the event that oil spills should occur in coastal bays, estuaries, or waters of the OCS proximate to mobile adult finfish or shellfish, the effects are expected to be nonfatal and the extent of damage is expected to

be limited and lessened due to some capability of adult fish and shellfish to avoid an oil spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. For floating eggs and larvae contacted by spilled oil, the effect is expected to be lethal.

The cumulative scenario for oil spills, subsurface blowouts, drilling mud discharges, and produced-water discharges is detailed on CPA pages IV-237 and IV-238.

Water Quality Impacts

Coastal Waters

Water quality in coastal waters along the Gulf may be altered by a number of coastal operations supporting offshore OCS oil and gas development. Trash, discharges, runoff, and spills may be released from onshore facilities and vessel traffic. Saltwater intrusion and sediment disturbances from channel maintenance dredging, from onshore pipeline emplacements, and from canal widening may adversely affect coastal waters. Besides coastal sources, offshore spills and trash occurring in association with OCS operations and reaching coastal waters may impact water quality conditions. A detailed analysis appears on CPA pages IV-114 through IV-117.

Marine Waters

Routine impact-producing factors that could result in water quality degradation from offshore OCS oil and gas operations include platform and pipeline installation and removal, and the discharge of operational wastes. Offshore accidents, such as blowouts and spills from platforms, shuttle tankers and barges, and pipelines, could also occur and have the potential to alter offshore water quality. Coastal operations that could impact offshore waters indirectly through the contamination of coastal waters are discussed under the coastal water quality analysis immediately preceding this analysis. A detailed analysis appears on CPA pages IV-117 through IV-121.

Cumulative Effects

Coastal Waters

A cumulative analysis is detailed on CPA pages IV-201 through IV-207. This cumulative analysis addresses coastal water quality contamination resulting from point- and nonpoint-source discharges, from both chronic small and large petroleum spills, and other chemical spills. The area analyzed includes coastal waters (both offshore State waters and inland waters).

CPA Section III.A.5. (pages III-15 through III-17) provides an overview of existing degradation problems and activities affecting the water quality of the GOM. The Gulf Coast has been heavily used and is now showing some signs of environmental stress. Large areas experience nutrient over-enrichment, low-dissolved oxygen, toxin and pesticide contamination, shellfish ground closures, and wetland loss. Because of identified pollution, some coastal waters currently do not fully support the designated activity uses of the water, such as swimming and fishing.

Point-source discharges are numerous along the Gulf of Mexico. One major type of point-source pollution in Gulf coastal waters is sediment loading resulting from dredging operations. Facilities located in the coastal zone that support the oil and gas petrochemical industry also discharge their wastewater into coastal waters. With the exception of some produced water, oil-field wastes will no longer be discharged directly into coastal waters but will be disposed of at commercial land farms, landfills, and injection pits.

Nonpoint-source pollution remains the leading cause of water quality impairment in the Gulf's rivers and estuaries. Activities contributing significant levels of nonpoint-source contamination to Gulf coastal waters include river runoff, agriculture, livestock farming, forestry, urban expansion, municipal and camp sewerage treatment processes, and marinas. Waterways draining over two-thirds of the United States enter the Gulf, transporting the wastes from three-fourths of the farms and ranches of the United States, 80 percent of the U.S. cropland, hundreds of cities, and thousands of industries not located in the Gulf's coastal zone.

The Gulf Coast is particularly susceptible to spills from crude oil, petroleum products, and hazardous wastes. While the trend for importing oil will increase annually, the trend for domestic production will decline. CPA Section IV.C. provides more information regarding non-OCS oil spills. CPA Section IV.A.3.h.(2) provides information regarding OCS-related oil spills.

The level of contamination in coastal waters from cumulative oil spills is dependent on the amount of petroleum hydrocarbons that enter the water column and the length of time that these hydrocarbons remain within the water column. These two factors, in turn, are dependent on the type of environment contacted by the slick, the size of the water surface covered by the slick, and the residence time that slick remains on the surface of the water. In addition to coastal spills, offshore spills may also impact coastal water quality if the spill is large enough and is transported into coastal waters by the prevailing currents and winds. The area of potential contact and the petroleum hydrocarbon water column residence times are very different if a spill reaches marshes or remains in open waters.

Marine Waters

A cumulative analysis is detailed on CPA pages IV-209 through IV-211. This cumulative analysis considers the effects of the OCS oil and gas leasing program, OCS sulfur mining program, oil tankering and other vessel traffic, and coastal inputs on offshore water quality. Specific offshore impact-producing factors considered in the analysis include the discharge of oil and gas drilling and production wastes, bottom disturbances from platform and pipeline emplacement and removal, accidental oil and hazardous substance spills, and operational and human-waste discharges from vessel traffic. Besides contamination occurring from the anthropogenic sources, contamination is occurring from natural sources, such as natural oil seeps and atmospheric inputs. There are also indications that offshore water quality conditions may be influenced by degraded coastal waters (i.e., increased dead zones, red tides, etc.). Studies have identified the Mississippi River, which drains two-thirds of the contiguous U.S., as the major source of contamination for Gulf waters. Chronic discharges and runoff into coastal waters, resulting primarily from municipal growth within the Gulf coastal zone, are assumed to have little influence on the widespread degradation.

Vessel traffic derived from the extensive maritime industry, the oil and gas support operations, and the recreational and commercial fishing operations acts as a point-source dumping of galley wastes, the sewage and sanitary wastes, and the bilge and ballast waters discharged into offshore waters. Besides discharges, vessel traffic can result in bottom disturbances through anchoring. Commercial fishing operations would also disturb large areas during trawling. The extent of these impacts is unknown.

CPA Section IV.A.3.h.(2) provides detail on oil spills. The frequency of occurrence and the area of contact of spilled oil are the major factors determining water quality degradation. This section provides projections on spill occurrence, probabilities for assumed occurrences, and the average size of many large offshore spill categories.

Spills of hazardous materials may, in many cases, pose a more serious threat to marine ecosystems than oil spills. Substantial amounts of hazardous materials enter the marine environment as a result of accidental spills. CPA Tables IV-4, IV-5, and IV-6 present the estimated number of exploration and delineation wells, production platforms, development wells, and the length of offshore pipeline needed to develop, produce, and transport the estimated resources for the OCS Program.

Bottom area disturbances resulting from the emplacement of drill rigs, the drilling of wells, and the installation of platforms and pipelines would increase water-column turbidity in the overlying offshore waters. CPA Section IV.A.3.a. provides the areal extent of disturbance for each of these activities.

Blowouts could also increase water-column turbidity. Not all blowout incidents would result in sediment releases or resuspensions. Given the annual low frequency of blowout events assumed and the likelihood that only some of these would disturb surrounding sediments and only for a short time period, blowout events would not be of consequence to future water quality.

The OCS oil and gas industry routinely generates a number of wastes that have the potential for degradation of the marine water quality. The discharge of drilling fluids and cuttings and produced water form the bulk of effluent discharge volumes from oil and gas development and production facilities. Current and future limits on the levels of contaminants in drilling muds and cuttings and produced-water discharges, discharge-rate restrictions, and monitoring and toxicity testing requirements are expected to eliminate many significant biological or ecological effects that were documented in the past. For deepwater facilities, although levels of discharges per deepwater facility would be higher than shallower water facilities, there would be fewer locations where discharges would take place in deep waters. Drilling discharges from facilities located in waters deeper than 400 m could reach the seafloor but would result in extremely low levels of sediment contamination, if any at all, and any cuttings would be distributed in very thin accumulations, extending out no more than 1,000 m from the discharge location. The plume from produced-water discharges is not expected to reach the seafloor in water depths greater than 100 m.

Sensitive Offshore Resources

Topographic Features Impacts

The topographic features of the Central and Western Gulf are listed and described in CPA Section III.B.2. A Topographic Features Stipulation similar to the one described in CPA Section II.C.1.c.(1) and reproduced below in the "Mitigation Measures" section has been included in appropriate leases since 1973. The impact analyses in both lease sale EIS's (USDOI, MMS, 1997 and 1998) include this biological lease stipulation. As noted in CPA Section II.C.1.c.(1), the stipulation establishes a No Activity Zone in which no bottom-disturbing activities would be allowed and areas around the No Activity Zones (in most cases) in which shunting of drill cuttings and drilling fluids to near the bottom would be required.

The potential impact-producing factors on the topographic features are anchoring (CPA Section IV.A.3.b.(1)), effluent discharge (CPA Section IV.A.3.d.), blowouts (CPA Section IV.A.3.h.(1)), oil spills (CPA Sections IV.A.3.h.(2)), structure removal (CPA Section IV.A.3.c.), and structure emplacement (CPA Section IV.A.3.a.).

Anchoring of pipeline lay barges, drilling rigs, or service vessels, and structure emplacement (pipeline, drilling rig, or production platform emplacement) results in mechanical disturbance of the benthic environment. Anchor damage has been shown to be the greatest threat to the biota of the offshore banks. However, the stipulation discussed above would preclude these activities in the No Activity Zone.

Discharges containing drilling muds and cuttings have the potential to impact the live-bottom organisms of topographic features through several mechanisms. These include augmenting water-column turbidity, smothering sessile invertebrates on the surrounding seafloor, and sediment contamination by accumulations of low concentrations of toxic constituents. The U.S. Environmental Protection Agency's (USEPA) National Pollutant and Discharge Elimination System (NPDES) general permit sets restrictions on discharges from drilling and production operations. Low levels of petroleum and metals could occur in sediments around production platforms, generally out to several hundred meters, particularly in very shallow, inner shelf areas. Traces of drilling fluids and drill cuttings are likely to be found in sediments as far as 2,000 to 3,000 m downcurrent from the drilling discharge for at least one year after the drilling operation ceases. Benthic marine organisms in proximity to OCS drilling and production platforms in shallow waters could still incur effects within 100 m from the discharge, usually in the direction of the plume flow. CPA Section IV.A.3.d. provides a detailed description of the impacts of drilling muds and cuttings on marine water quality and seafloor sediments.

Produced waters are a potential source of impact on the biota of topographic features as they may contaminate sediments with moderate levels of petroleum and metals. Produced water constitutes the largest single source of material discharged into the Gulf during routine oil and gas operations. Yet, no sediment contamination should result from produced-water discharges in water depths greater than 100 m. Petroleum and metal contamination of sediments could occur and impact benthic organisms out to 100 m downcurrent from the discharge point. The USEPA's NPDES general permit sets restrictions on produced-water discharges. CPA Section IV.D.1.a.(3)(b) contains

a detailed description of the impacts of produced waters on marine water quality and seafloor sediments.

Blowouts can occur from either oil or gas wells. The resuspension of large amounts of sediments following a subsurface blowout could disturb the surrounding seafloor and stress the local benthic community by factors including sediment smothering, potential exposure to resuspended toxic contaminants, and light attenuation. Should oil or condensate be present in the producing reservoir, liquid hydrocarbons could also be an added source of negative impact on the benthic community (low-molecular-weight hydrocarbons (gases) would dissolve in the water column until saturation is reached). The bulk of the blowout materials would be redeposited within a few thousand meters of their source. In particular, sand would be redeposited within 400 m of the blowout site. A blowout directly on or near a topographic feature could have consequences lasting more than 10 years. Since the proposed stipulation would preclude drilling in the No Activity Zone, most adverse effects from blowouts would be prevented.

Surface oil spills may occur either as a result of tanker spillages or platform spills. Spills on the seafloor could be caused by a pipeline rupture or a well blowout. Both surface and subsurface spills could result in a steady discharge of oil over a long period of time. Oil spills are estimated to result equally from surface spills and seafloor spills.

Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 m depth, although modeling exercises have indicated such oil may reach a depth of 20 m. Because the crests of topographic features in the northern Gulf are found below 10 m, no oil from a surface spill could reach their sessile biota. In any event, spills originating outside the No Activity Zones would reach topographic features in diluted concentrations since the proposed stipulation would preclude drilling in a No Activity Zone to prevent adverse effects from nearby drilling on topographic features.

A subsurface oil spill (pipeline spill) could reach a topographic feature and has the potential of considerably impacting the local biota actually contacted by the oil.

Structure emplacement and pipeline emplacement are other oil and gas activities that could resuspend sediments. The proposed stipulation would also prevent these activities from occurring in the No Activity Zone, thus preventing most of these resuspended sediments from reaching the biota of the banks. A detailed analysis appears on CPA pages IV-108 through IV-112.

Cumulative Effects

The Topographic Features Stipulation is assumed to be in effect in the cumulative scenario. The continued application of this stipulation would prevent any direct adverse impacts on the biota of the topographic features potentially generated by oil and gas operations. The cumulative impact from routine oil and gas operations includes effects resulting from the proposed action (CPA Section IV.D.1.a.(2)(c)), as well as those resulting from past and future OCS leasing. These operations include anchoring, structure emplacement, effluent discharge, blowouts, oil spills, and structure removal. Potential non-OCS-related factors include vessel anchoring, treasure hunting activities, ocean dumping, tankering of imported oil, heavy storms and hurricanes, the collapse of the tops of the features due to dissolution of the underlying salt structure, fishing, and recreational scuba diving.

Mechanical damage, including anchoring, is considered to be a definite threat to the biota of topographic features. The proposed biological stipulation prohibits oil and gas leaseholders from anchoring vessels and placing structures in the No Activity Zones; the stipulation does not affect other non-OCS activities such as anchoring, fishing, or recreational scuba diving. No data are available on the extent to which non-OCS activities may take place; however, these activities are known to occur in proximity to the topographic features. Nearly all the topographic features are found near established shipping fairways and are apparently well-known fishing areas. Also, several of the shallower topographic features are frequently visited by scuba divers. Anchoring at a topographic feature by a vessel involved in any of these activities could damage the biota. The continued application of the biological stipulation should preclude anchoring of pipeline barges, drilling rigs, or service vessels, and structure emplacement (pipeline, drilling rig, or platform emplacement) by oil and gas leaseholders in the No Activity Zone, thus preventing adverse impacts on benthic communities of topographic communities. The degree of damage would depend on the size of the anchor and chain. Anchor damage may necessitate more than 10 years for recovery.

Impacts on the topographic features could occur as a result of spills or operational discharges from import tankering. Due to dilution and the depths of the crests of the topographic features, discharges should reach topographic features in insufficient concentrations to cause impacts.

Depending on the levels of fishing pressure exerted, fishing activities that occur at the topographic features may impact local fish populations.

The routine discharge of drilling muds and cuttings probably is significant under the cumulative scenario; it is assumed that several million tons of drilling fluids and cuttings would be discharged in water depths less than 200 m. The areal extent of the topographic features relative to the area of the entire Central and Western Gulf of Mexico is small, so the actual amounts of these discharges in the vicinity of the topographic features would be a fraction of this total. Continued application of the Topographic Features Stipulation would require lease operators to comply with measures, such as shunting, that would keep discharged materials at depths below sensitive biota. Small amounts of drilling effluent may reach a bank from wells outside the No Activity Zone; however, these amounts, where measurable, would be extremely small and would be restricted to small areas and have sublethal effects on the biota. Such impacts would occur infrequently.

With the inclusion of the proposed Topographic Features Stipulation, no discharges of effluents, including produced water, would take place within the No Activity Zones. Discharges in areas around the No Activity Zone would be shunted to within 10 m of the bottom. This procedure, combined with the new USEPA discharge regulations and permits, should eliminate the threat of discharges reaching and affecting the biota of a topographic high. The impacts that these discharges could cause would be primarily sublethal damages that could lead to a possible disruption or impairment of a few elements at the regional or local scale, but no interference to the general system performance should occur. Recovery of the impacted area to pre-interference conditions would take place within 2 years.

Blowouts outside the No Activity Zones are unlikely to impact the biota of the topographic features. Few, if any, of the expected number of blowouts would occur in the immediate vicinity of the topographic features. It is assumed that a resuspension of sediments or a subsurface oil spill following a blowout could reach the biota of a topographic feature. If this were to occur, the impacts would be primarily sublethal with the disruption or impairment of a few elements at the local scale,

but no interference to the general system performance would occur, and recovery of the impacted area to pre-interference conditions would take place within 2 years.

Because of the water depths in which topographic features are found, no oil from surface spills would reach the biota of concern at concentrations likely to cause impacts. A subsurface oil spill from a pipeline rupture could, however, reach the biota of a topographic feature. Such spills are assumed to rise quickly to the surface, and any oil remaining at depth would be swept clear by currents moving around the topographic features. If a seafloor oil spill (e.g., pipeline) were to occur, the spill would have to come into contact with a biologically sensitive feature to have an impact. The extent of damage from any given spill would probably be concentrated on only one of the sensitive areas given that topographic features are widely spread out in the northern Gulf, and given the random nature of spill locations, the potential impacts of oil spills on biological resources of the topographic features would probably be restricted to discrete locations. Furthermore, the No Activity Zones established by the proposed Topographic Features Stipulation would serve to keep such occurrences away from the topographic features. In the unlikely event that oil from a subsurface spill would reach the biota of a topographic feature, the effects would be primarily sublethal for corals and much of the other adult reef biota. It is anticipated that recovery for such an event would occur within a period of 2 years. In the highly unlikely event that oil from a subsurface spill could reach a coral covered area in lethal concentrations, the area so impacted would be small, but recovery of this area could take in excess of 10 years. Additional detail of cumulative analysis appears on CPA pages IV-198 through IV-200.

Live Bottom (Pinnacle Trend) Impacts

Seventy blocks are within the region defined as the pinnacle trend, which contains live bottoms that may be sensitive to oil and gas activities. The latter are located in the northeastern portion of the Central Gulf and adjacent areas of the Eastern Gulf in between 53 and 110 m water depths in the Main Pass and Viosca Knoll Areas. Leases in past sales have contained a Live Bottom Stipulation to protect such areas, and a proposed stipulation is presented in CPA Section II.C.1.c.(2) (and reproduced below in the "Mitigation Measures" section) as a potential mitigating measure for leases resulting from the proposed action. The stipulation is designed to prevent drilling activities and anchor emplacement (the major potential impacting factors on these live bottoms resulting from offshore oil and gas activities) from damaging the pinnacles. Under the stipulation, all postlease plans would be reviewed on a case-by-case basis to determine whether a proposed operation could impact a pinnacle feature. If it is determined from studies information, geohazard survey information, or another source that the operation would impact a pinnacle feature, the operator may be required to relocate the proposed operation. Although the Live Bottom Stipulation is regarded as a highly effective protection measure, infrequent accidental impacts are possible. Such incidents may be caused by operator positioning errors or when studies and/or geohazard information are inaccurate in mapping or fail to note the presence of pinnacle features.

A number of OCS-related factors may cause adverse impacts on the pinnacle trend communities and features. Damage caused by oil spills, blowouts, anchoring, structure emplacement and removal, pipeline emplacement, drilling discharges, produced-water discharges, and the disposal of domestic

and sanitary wastes can cause the immediate mortality of live-bottom organisms or the alteration of sediments to the point that recolonization of the affected areas may be delayed or impossible.

Descriptions of these factors is essentially the same as those shown above for topographic features. There is some relationship of scale to the relative impacts to pinnacles as compared to topographic features. For example, anchor damage could include crushing and breaking of the pinnacles and associated communities. Anchoring often destroys a wide swath of habitat when the anchor is dragged or the vessel swings at anchor, causing the anchor chain to drag the seafloor.

Drilling discharges can affect biological communities and organisms by obvious mechanisms such as the smothering of organisms through deposition of discharged materials and the less obvious sublethal toxicological impacts (e.g., depressed growth and reproduction). Direct observations by Shinn et al. (1993) of a 4-5 m high pinnacle feature, located at a 103 m depth and inundated by drill muds and cuttings concluded that the pinnacle feature adjacent to the drill site as well as nearby rock bottom did not appear to be affected. Drilling discharges are still considered to have a deleterious impact on the live-bottom communities of the pinnacle trend, and the stipulation will continue to be applied to minimize the possibility of similar occurrences. Additional detailed analysis appears on CPA pages IV-101 through IV-104.

Cumulative Effects

This cumulative analysis considers the effects of impact-producing factors plus those related to prior and future OCS sales, and to tanker and other shipping operations that may occur and adversely affect live bottoms associated with the pinnacle-trend area. Specific types of OCS-related, impact-producing factors considered in the analysis include structure emplacement and removal; discharges from well drilling; produced waters; pipeline emplacement; oil spills; blowouts; anchoring; and operational discharges by tanker ships. Non-OCS-related impacts, including fishing pressure, natural events, added anchoring by recreational boats, occasional large vessel anchoring, and spillage from import tankering, all have the potential to alter the pinnacle communities.

Biological stipulations or comparable mitigation are assumed to be made a part of appropriate leases resulting from the OCS Program. The stipulations force the operators to locate the individual pinnacle features and associated communities that may be present in the block. Stipulations would protect pinnacle trend live bottoms potentially impacted by OCS activities by requiring appropriate mitigative measures. The biological stipulations do not affect or protect the resources from activities over which the MMS has no authority (i.e., commercial fishing, tanker and shipping operations, or recreational activities).

Non-OCS activities have the greatest potential to affect the hard-bottom communities of the region. Recreational boating and fishing, import tankering, and natural events (such as storm and hypoxic conditions) may damage and threaten the hard-bottom communities. Similar to topographic features, ships may choose to anchor in this area on occasion. Numerous fishermen also take advantage of the relatively shallow and easily accessible resources of the region and probably anchor in the pinnacle trend area to fish. It is assumed that the biota of the pinnacle trend is well adapted to natural events such as storms, turbidity plumes, and hypoxia conditions. A severe event could cause important damage to pinnacle trend biota, possibly leading to changes of physical integrity,

species diversity, or biological productivity exceeding natural variability. If such an event were to occur, recovery to pre-impact conditions could take 5-10 years.

Structure placement and anchor damage from support boats and ships, floating drilling units, and pipeline-laying vessels disturb areas of the seafloor. Such disturbance is considered as the most important threat to live-bottom areas at these depths. The biological stipulations limit the proximity of new activities to pinnacle features. Platforms in this region would probably be placed away from pinnacle features, thus, anchoring events should not impact the resource. Accidental anchoring (none have been documented to date) would severely impact, a pinnacle substrate, and recovery could take 5-10 years depending on the severity.

The explosive removal of structures should not affect pinnacle features considering the blast attenuation and considering that sessile and other benthic organisms are known to resist structure removal-type blasts, that sediment resuspensions associated with structure removals would not last long (24 hr for the water column 4 m off the bottom and above, and 7-10 days for the water layer contained in the first 4 m off the seafloor) and would only impact an area contained within a radius of approximately 1,000 m.

Routine discharges of drilling muds and cuttings by oil and gas operations could affect biological communities and organisms through a variety of mechanisms, including the smothering of organisms through deposition or less obvious sublethal effects (impacts to growth and reproduction). The current biological stipulation would prevent drilling activities and drilling discharges from occurring directly over a pinnacle feature. As discussed in CPA Section IV.D.1.a.(3), drilling discharges should reach undetectable concentrations in the water column within 1,000 m of the discharge point, thus limiting toxic effects to any benthic organisms occurring within a 1,000-m radius from the discharge point. Regional surface currents and the water depth (greater than 75 m) would greatly dilute the effluent. Deposition of drilling muds and cuttings in the pinnacle trend area should therefore not greatly impact the biota of the pinnacles or the surrounding habitat. The impact from muds and cuttings discharged as a result of the cumulative scenario would be minor in scope, primarily sublethal in nature, and the effects would be bound to small areas. Recovery to pre-impact conditions from these sublethal impacts would take place within 2 years.

The depth of the pinnacle features (greater than 40 m) (CSA, 1992), the prevailing regional currents, and discharges probably being offset from the pinnacle features (provided through enforcement of the Live Bottom Stipulation) would result in the dilution of produced waters and domestic and sanitary wastes to harmless levels before reaching any of the live-bottom organisms of the pinnacle trend. Adverse impacts from discharges of produced waters and domestic and sanitary wastes as a result of the cumulative case would therefore be minor in scope, primarily sublethal in nature, and the effects would be confined to small areas.

The Live Bottom Stipulation should prevent leaseholders from conducting pipeline emplacement directly upon pinnacle trend, live-bottom communities. The effect of pipeline-laying activities on the biota of these communities would probably be restricted to the resuspension of sediments by the possible obstruction of the filter-feeding mechanisms of sedentary organisms and gills of fishes. Adverse impacts from resuspended sediments would be minor in scope, primarily sublethal in nature, and the effects would be limited to small areas. Recovery to pre-impact conditions from these sublethal impacts would take place within 2 years.

Assumptions of oil-spill occurrences, spill sizes, and estimated contacts with shoreline and wetlands areas resulting from the OCS Program are described in CPA Sections IV.A.3.h.(2) and IV.C.5. Oil-spill effects are similar to those described for topographic features. It is projected that no surface spills, regardless of size, would have an impact on the biota of the pinnacle trend, largely because they crest at depths greater than 20 m.

Should a pipeline spill ever occur in the immediate vicinity of a pinnacle, however, impacts, including the uptake of hydrocarbons and attenuated incident light penetration, could cause incidences of mortality in the local biota. Most of the biota, however, would likely survive and recover once the pinnacles were clear of oil. Thus, if a contact were to occur, the severity to the pinnacle community would be mostly restricted in its extent. The adverse impacts from subsurface oil spills would be minor in scope, primarily sublethal in nature, and the effects would be contained within small area. Recovery to pre-impact conditions from these sublethal impacts could take place within 2 years.

Blowouts have the potential of resuspending sediments and releasing hydrocarbons into the water column, which may affect pinnacle-trend communities. Subsurface blowouts occurring near these communities can pose a threat to the biota. The severity and proximity of such an occurrence to the pinnacle trend cannot be predicted. The continued implementation of the Live Bottom Stipulation should prevent blowouts from occurring directly on or in close proximity to a pinnacle feature. What can be predicted is that such blowouts would, in many cases, cause oil to be spilled and sediments to be released and resuspended. A severe subsurface blowout within 400 m of a pinnacle feature could result in the smothering of the biota within that feature due to sedimentation. Since much of the pinnacle biota is adapted to turbid conditions, most impacts would probably be sublethal with recovery taking place within 2 years.

III. MMS's Views of the Effects of the Proposed Action on EFH

Summaries of impact analyses and MMS's views of the effects are also derived from the CPA document (USDOI, MMS, 1997). Due to their relative brevity, they will be presented in this EFH Assessment in their entirety.

Fisheries Impacts

Operations resulting from the proposed action have the potential to cause detrimental effects on CPA and WPA commercial fisheries. Activities such as seismic surveys, subsurface blowouts, pipeline trenching, and OCS discharge of drilling muds and produced water will cause negligible impacts and will not deleteriously affect Central and Western Gulf commercial fisheries. Operations such as production platform emplacement, underwater OCS impediments, explosive platform removal, oil spills, and activities that result in coastal environmental degradation will cause greater impacts on Central and Western Gulf commercial fisheries. The proposed action is expected to result in less than a 1 percent decrease in commercial fishery populations, in essential habitat, or in commercial fishing. It will require less than six months for fishing activity and one generation for fishery resources to recover from 99 percent of the impacts during a single action period considered in the CPA analysis.

Cumulative Effects

Impact-producing factors of the cumulative scenario that are expected to substantially affect commercial fisheries include coastal environmental degradation, overfishing, oil spills, and pipeline trenching. At the estimated level of effect, the resultant influence on Central and Western Gulf fisheries is expected to be substantial and easily distinguished from effects due to natural population variations.

The incremental contribution of the proposed action to the cumulative impact is inconsequential. The effects of impact-producing factors (coastal environmental degradation, emplacement of production platforms, underwater OCS obstructions, production platform removals, seismic surveys, oil spills, subsurface blowouts, pipeline trenching, and offshore discharges of drilling muds and produced waters) related to the proposed action are expected to be negligible. The impact of the cumulative scenario is expected to result in less than a 10 percent decrease in commercial fishery populations, in essential habitat, or in commercial fishing.

Rigs-to-Reefs

The use of obsolete oil and gas platforms for artificial reefs has proven to be highly successful. Their large numbers, design, longevity, and stability have provided a number of advantages over the use of traditional artificial reef materials. To take advantage of the availability of obsolete oil and gas platforms as valuable reef fish habitats, the States of Louisiana and Texas, in 1986 and 1989, respectively, passed legislation enabling Rigs-to-Reefs (RTR) and developed RTR plans. Each State sets up a mechanism to transfer ownership and liability of a platform from oil and gas companies to the State when the platform ceases production. The oil and gas company saves money by donating a platform to the State for a reef rather than dismantling the platform and disposing of it onshore. The company donates a portion of these savings to the State to support its artificial reef program. Since the inception of the RTR plans, more than 100 retired platforms have been donated and used for reefs offshore Louisiana and Texas. Mississippi and Alabama are currently developing RTR plans to take advantage of the opportunity to use retired platforms for artificial reefs.

Water Quality Impacts

Coastal

Future water quality degradation associated with effluent discharges and runoff from the use of onshore infrastructure and coastal waterways supporting proposed action operations is small in relation to all sources. Because there are so many facilities that are located throughout the coastal zone area, the area where contamination could be occurring is assumed to be widespread.

Some coastal discharges of OCS-generated produced water will continue at least until the year 2000. The contribution to any impacts from this operation attributable to the proposed action is assumed to be very minor. Maintenance dredging of between 5 and 10 million m^3 of sediment could result in impacts (primarily increased turbidity and resuspended contaminants) that would preclude uses of the waters immediately surrounding dredged sites and lasting up to several months. Water

clarity within the navigation channels where the majority of vessel operations are assumed to occur will be compromised as a result of continuous sediment influx from bank erosion, natural widening, and reintroduction of dredged material back into surrounding waters.

Given that so few spills are expected to impact coastal waters (about 1-3 coastal spills per year and only a 20% probability of one large spill occurring) and that the vast majority would be very small (95% are estimated to be 1 bbl or less), oil-spill events are not likely to become major contributors to regional petroleum contamination of Gulf coastal waters. Spills occurring in the coastal zone or from offshore operations reaching coastal waters from proposed action operations are expected to cause acute, localized impacts. Except for the short-term effects of dredging and oil spills, impacts to coastal waters from the proposed action should not disrupt current activity uses designated for these waters.

Cumulative Effects

Contaminant inputs to coastal waters bordering the Gulf of Mexico will continue to be the result of large volumes of water entering the Gulf from rivers draining over two-thirds of the contiguous United States. Other major sources that are expected to contribute to the contamination of Gulf coastal waters include the petrochemical industry, agriculture, forestry, urban expansion, municipal and camp sewerage treatment processes, marinas and recreational boating, maritime shipping, and hydromodification activities. Lesser sources of contaminants are likely to be large commercial waste disposal operations, livestock farming, manufacturing industry activities, nuclear power plant operations, and pulp and paper mills. Runoff and wastewater discharge from all these sources are resulting in water quality changes in coastal waters of the Gulf of Mexico. About 400 commercial facilities supporting OCS operations would contribute less than 9 percent of all industrial wastewaters.

Vessel traffic will degrade coastal water quality through routine releases of bilge and ballast waters, chronic fuel and tank spills, trash, and domestic and sanitary discharges. The greatest impacts from commercial vessel traffic will occur along navigation channels from elevated levels of hydrocarbons and tributyltin compounds found in bilge waters and marine paints, and within highly populated, confined harbors and anchorages from increased BOD and pathogens from sanitary and domestic waste discharges. Increased turbidity resulting from 9 to 10 million m^3 of sediment estimated to be dredged annually constitute another considerable type of point-source pollution in the Gulf coastal waters. Dredged sediments will enter coastal waters either directly by open-water dumping or indirectly when the sediments originally dredged and emplaced onto spoil banks and into wetlands will wash and erode away.

Considering the frequency, the large number, and the widespread locations of anticipated spills, a large percentage of coastal waters could be affected by petroleum inputs. The contamination should be primarily localized and not long-term enough to preclude designated uses of the waters. In the areas where oil spills are most likely to be a recurring problem, coastal waters could become subject to low-level and chronic regional petroleum contamination. Spill events from OCS-support operations constitute between 8 and 10 percent of the total spill events estimated to occur during a typical future year.

It is assumed that coastal water quality should not deteriorate significantly beyond its current condition. Coastal industries and municipalities should continue to expand at a steady rate over the next 39 years. Yet, by adopting improved regulatory programs, Gulf Coast States' contamination levels in point- and nonpoint-source discharges should decrease, thus probably leaving water quality unchanged from its current condition. As a result, spills, chronic discharges and runoff into Texas, Louisiana, Mississippi, and Alabama coastal waters, caused primarily by urban growth and secondarily by the petrochemical industry, will likely result in continued low-level, regional degradation of coastal waters.

Marine Waters

Sediment disturbance from the emplacement and removal of platforms and associated pipelines and from the drilling of wells is expected to result in minor, localized, temporary increases in water-column turbidity in offshore waters. Given the low frequency of estimated explosive platform removals and blowouts, minimum impacts on water quality due to resuspension of sediments are expected from removal operations and accidental blowout events.

Oil spills related to the proposed action are assumed to be mostly very small events, and, for spills greater than 50 bbl, to occur very infrequently. Given these numbers and expected duration of any impacts, spills due to the proposed action would cause degraded water conditions for only a short duration (from a few days to 3 months) and would affect only a small area of offshore waters at any one time.

Current and future limits on the levels of contaminants in drilling muds and cuttings and produced-water discharges, discharge-rate restrictions, and monitoring and toxicity testing requirements are expected to eliminate many significant biological or ecological effects that were documented in the past. For shallow developments, elevated levels of some contaminants found in the plumes of produced-water discharges and drilling mud discharges are expected to be detected out to 3,000 m downcurrent from the discharge point; however, no ecological effects to water-column organisms are expected from the levels allowed. For deepwater facilities, although levels of discharges per deepwater facility would be higher than shallower water facilities, there would be fewer locations where discharges would take place in deep water. Drilling discharges from facilities located in waters deeper than 400 m could reach the seafloor but would result in extremely low levels of sediment contamination, if any at all, and any cuttings would be distributed in very thin accumulations, extending out more than 1,000 m from the discharge location. The plume from produced-water discharges is not expected to reach the seafloor in water depths greater than 100 m. More information is needed on the vertical transport of surface discharges into deep waters. Biological adverse effects from OCS discharges are most likely to occur in the sediments downcurrent from and within 100 m of the discharge point, particularly if the water depth is shallow and the discharge rate is high.

Contaminants discharged from routine operations and entering Gulf waters from spills would contribute less than 1 percent to any possible long-term, regional offshore water quality degradation that may be occurring.

Cumulative Effects

Sediment disturbances caused by maximum annual emplacement of 90-150 new platforms and associated pipeline systems and the removal of, at most, 65 platforms annually and some associated pipelines, from the drilling of a maximum of 250-350 exploratory wells and a maximum of about 600 development wells, and from commercial fishing trawler operations and vessel anchoring are assumed to result in localized, short-term increases in water-column turbidity in offshore waters. The risk of water quality degradation would be heightened if these operations occur frequently in proximity to each other. Given the few projected explosive platform removals and blowouts projected to occur in a typical year, resuspension of sediments is assumed to have minimal impacts on water quality.

Future waste discharges from OCS operations are assumed not to degrade offshore water or sediment quality great enough to cause any acute, toxic effects to any living organism beyond 100 m from the discharge. Some bioaccumulation may be occurring. The effect to the food web is unknown but unlikely because of the extremely low levels of uptake and the low bioavailability of these compounds.

Municipal, agricultural, and industrial coastal discharges and land runoff would continue to impact the long-term health of marine waters of the Gulf of Mexico. Coastal inputs are assumed to exceed all other sources, with the Mississippi River continuing to be the major source of contaminants to marine waters. Offshore vessel traffic would contribute, in a small way, to regional degradation of offshore waters through spills and waste discharges. All spill incidents (OCS and others) are assumed to cause local, water quality changes up to three months for each incident and to make a small addition to the regional petroleum contamination of Gulf waters.

Sensitive Offshore Resources

Topographic Features Impacts

The Topographic Features Stipulation could prevent most of the potential impacts from bottom-disturbing activities (structure removal and emplacement), operational discharges (drilling muds and cuttings, and produced waters), blowouts, and surface and subsurface oil spills. Recovery from impact incidences of operational discharges and blowouts would take place within 2 years.

Contact with spilled oil would cause lethal and sublethal effects in benthic organisms. The oiling of benthic organisms is not likely because the proposed Topographic Features Stipulation would keep sources of spills away from the immediate vicinity of topographic features. In the unlikely event that oil from a subsurface spill would reach the biota of a topographic feature, the effects would be primarily sublethal for adult sessile biota, including coral colonies in the case of the Flower Garden Banks, and there would be limited incidences of mortality. The recovery of harmed benthic communities could take more than 10 years.

Cumulative activities causing mechanical disturbance represent the greatest threat to the topographic features. This would, however, be prevented by the continued application of the Topographic Features Stipulation. Potential OCS-related impacts include anchoring of vessels and

structure emplacement, operational discharges (drilling muds and cuttings, and produced waters), blowouts, oil spills, and structure removal.

The proposed Topographic Features Stipulation would preclude mechanical damage caused by oil and gas leaseholders from impacting the live-bottom communities of the topographic features and would protect them from operational discharges. As such, little impact would be incurred by the biota of the topographic features. The likelihood of any discharge-related impacts would be even further reduced by the new USEPA discharge regulations and permits (CPA Section IV.D.1.a.(3)). Recovery from any discharge-related impacts would take place within 2 years.

Blowouts could potentially cause damage to benthic biota, but due to the application of the proposed Topographic Features Stipulation, they would not occur in the immediate vicinity of the live-bottom communities; therefore, they would have little impact on the biota of the topographic features. Recovery from any impact would take place within 2 years.

Oil spills can cause damage to benthic organisms when the oil contacts the organisms. The proposed Topographic Features Stipulation would keep sources of spills (pipelines and platforms) away from the immediate biota of the topographic features. In the unlikely event that oil from a subsurface spill would reach the biota of a topographic feature, the effects would be primarily sublethal for corals (in the case of the Flower Garden Banks) and much of the other adult biota. It is anticipated that recovery for such an event would occur within 2 years. In the highly unlikely event that oil from a subsurface spill reached an area containing coral cover (e.g., Flower Garden Banks) in lethal concentrations, the impacted area would be small, but its recovery could take in excess of 10 years.

Non-OCS activities are thought to have the greatest potential of impacting the topographic features, particularly those that could mechanically disrupt the bottom (such as anchoring and treasure-hunting activities, as described above). Natural events such as hurricanes or the collapse of the tops of the topographic features (through dissolution of the underlying salt structure) could cause severe impacts. The collapsing of topographic features is unlikely and would, at the most, impact a single topographic feature. Impacts from scuba diving, fishing, ocean dumping, and discharges or spills from tankering of imported oil are likely to have little or no impact on the topographic features.

The incremental contribution of the proposed action (as analyzed in CPA Section IV.D.1.a.(2)(c)) to the cumulative impact is slight because of the implementation of the Topographic Features Stipulation, which would limit mechanical impacts and operational discharges. Furthermore, there is a low probability and low risk of accidental OCS-related events such as blowouts and oil spills occurring in the immediate vicinity of a topographic feature.

Live Bottom (Pinnacle Trend) Impacts

Activities resulting from the proposed action are not expected to adversely impact the pinnacle trend environment because of implementation of the Live Bottom Stipulation. No community-wide impacts are expected. The inclusion of the Live Bottom Stipulation would minimize the potential for mechanical damage. The impacts of the proposed action are expected to be infrequent because of the few operations in the vicinity of the pinnacles and the small size and dispersed nature of many of the features. Potential impacts from blowouts, pipeline emplacement, mud and cutting discharges,

and structure removals would be minimized because of the proposed Live Bottom Stipulation and the low levels of oil and gas activities anticipated in the area. Oil spills would not be followed by adverse impacts (e.g., high elevated decrease in live cover) because of the depth of the features and dilution of spills (by currents and the quickly rising oil). The frequency of impacts on the pinnacles would be rare, and the severity should be slight because of the widespread nature of the features. Impacts from accidents involving anchor placement on pinnacles (those actually crushed or subjected to abrasions) could be severe in a few areas.

Cumulative Effects

Non-OCS activities in the vicinity of the hard-bottom communities include recreational boating and fishing, import tankering, and natural events (such as storm and hypoxic conditions). These may lead to severe damage that could threaten the pinnacle trend communities. Ships using the fairway into Mobile, Alabama, would probably anchor in this area on occasion, and numerous fishermen take advantage of the relatively shallow and easily accessible resources of the region. These activities could lead to several instances of severe and permanent mechanical damage.

Impact-producing factors resulting from routine activities of OCS oil and gas operations include mechanical damage, damage caused by underwater oil spills, blowouts, anchoring, structure emplacement and removal, pipeline emplacement, drilling discharges, and discharges of produced waters and of domestic and sanitary wastes. Long-term OCS activities should not adversely impact the pinnacle trend environment if these impact-producing factors are restrained by the continued implementation of the Live Bottom Stipulation. The inclusion of the Live Bottom Stipulation would preclude the occurrence of mechanical damage, the most potentially damaging of these activities. The impacts to the pinnacle trend are judged to be infrequent because of the small number of operations in the vicinity of the pinnacles and the small size and dispersed nature of many of the features. The impact to the pinnacle trend area as a whole would probably be slight because of the projected lack of community-wide impacts.

Impacts from blowouts, pipeline emplacement, muds and cuttings discharges, other operational discharges, and structure removals should be minimized because of the proposed Live Bottom Stipulation and the dilution of discharges and resuspended sediments in the area. Potential impacts from discharges will probably be further reduced by USEPA discharge regulations and permits (CPA Section IV.D.1.a.(3)). Potential impact from Size 3 oil spills would be restricted because of the depth of the features, dilution of underwater spills (by currents and the quickly rising oil), and the low prospect of pipelines being routed immediately adjacent to the pinnacle features. The frequency of impacts to the pinnacles should be rare, and the severity slight, because of the widespread nature of the features. Impacts from accidents involving anchor placement on pinnacles could be severe in small areas (those actually crushed or subjected to abrasions).

The incremental contribution of the proposed action (as analyzed in CPA Section IV.D.1.a.(2)(a)) to the cumulative impact should be slight, with possible impacts from mechanical disturbance of the bottom, discharges of drilling muds and cuttings, other OCS discharges, structure removals, and oil spills. Negative impacts should be restricted by the implementation of the Live Bottom (Pinnacle Trend) Stipulation, the depths of the features, the currents in the area, and the probable low level of OCS activities in the pinnacle trend area.

IV. Mitigation Measures

Mitigating measures have been proposed, identified, evaluated, or developed through previous MMS lease sale NEPA review and analysis processes. Many of these mitigating measures have been adopted and incorporated into regulations and guidelines governing OCS exploration, development, and production activities. All plans for OCS activities go through MMS review and approval to ensure compliance with established laws and regulations. Mitigating measures must be incorporated and documented in plans submitted to MMS. Operational compliance is enforced through the MMS on-site inspection program. EFH-related mitigation measures include the following:

A. Establish No Activity and Modified Activity Zones around Topographic Features through the Topographic Features Stipulation.

The stipulation reads as follows:

Topographic Features Stipulation

(a) No activity including structures, drilling rigs, pipelines, or anchoring will be allowed within the listed isobath ("No Activity Zone") of the topographic features.

(b) Operations within the area shown as "1,000-Meter Zone" shall be restricted by shunting all drill cuttings and drilling fluids to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom.

(c) Operations within the area shown as "1-Mile Zone" shall be restricted by shunting all drill cuttings and drilling fluids to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom. (Where there is a "1-Mile Zone" designated, the "1,000-Meter Zone" in paragraph (b) is not designated.)

(d) Operations within the area shown as "3-Mile Zone" shall be restricted by shunting all drill cuttings and drilling fluids from development operations to the bottom through a downpipe that terminates an appropriate distance, but no more than 10 meters, from the bottom.

B. Delete the Flower Garden Banks from Areawide Lease Sales (both prior to and after the Establishment of the National Marine Sanctuary.

C. Require Surveys to Detect and Avoid Biologically-Sensitive Areas such as Pinnacles, Low-Relief Live Bottoms, and Chemosynthetic Communities Including the Use of the Live Bottom (Pinnacle Trend) Stipulation.

The stipulation reads as follows:

Live Bottom (Pinnacle Trend) Stipulation

(To be included only on leases in the following blocks: Main Pass Area, South and East Addition Blocks 190, 194, 198, 219-226, 244-266, 276-290; Viosca Knoll Area Blocks 473-476, 521, 522, 564, 565, 566, 609, 610, 654, 692-698, 734, 778.)

For the purpose of this stipulation, "live bottom areas" are defined as seagrass communities; or those areas which contain biological assemblages consisting of such sessile invertebrates as sea fans, sea whips, hydroids, anemones, ascidians, sponges, bryozoans, or corals living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; or areas whose lithotope favors the accumulation of turtles, fishes, and other fauna.

Prior to any drilling activities or the construction or placement of any structure for exploration or development on this lease, including, but not limited to, anchoring, well drilling, and pipeline and platform placement, the lessee will submit to the Regional Director (RD) a live bottom survey report containing a bathymetry map prepared utilizing remote sensing techniques. The bathymetry map shall be prepared for the purpose of determining the presence or absence of live bottoms which could be impacted by the proposed activity. This map shall encompass such an area of the seafloor where surface disturbing activities, including anchoring, may occur.

If it is determined that the live bottoms might be adversely impacted by the proposed activity, the RD will require the lessee to undertake any measure deemed economically, environmentally, and technically feasible to protect the pinnacle area. These measures may include, but are not limited to, the following:

(a) the relocation of operations; and

(b) the monitoring to assess the impact of the activity on the live bottoms.

D. Oil Spill Contingency Plans: In compliance with 30 CFR 254, all owners and operators of oil handling, storage, or transportation facilities located seaward of the coastline must submit an Oil Spill Response Plan (OSRP) to MMS for approval. Owners or operators of offshore pipelines carrying are required to submit a plan for any pipeline that carries oil, condensate that has been injected into the pipeline, or gas and naturally occurring condensate; pipelines carrying essentially dry gas do not require a plan. A response plan must be submitted before an owner/operator can use a facility. To continue operations, the facility must be operated in compliance with the approved plan.

All MMS-approved OSRP's are required to be reviewed and updated every two years. Revisions to a response plan must be submitted to MMS within 15 days whenever: (1) a change occurs that significantly reduces an owner/operator's response capabilities; (2) a significant change occurs in the worst case discharge scenario or in the type of oil being handled, stored, or transported at the facility; (3) there is a change in the name(s) or capabilities of the oil-spill removal organizations cited in the plan; or (4) there is a significant change in the appropriate Area Contingency Plans.

E. Discharge and Pollution Regulations: The MMS has promulgated regulations to ensure lessees do not create conditions that will pose an unreasonable risk to public health, life, property, aquatic life, wildlife, recreation, navigation, commercial fishing, or other uses of the ocean. Control and removal of pollution is the responsibility and at the expense of the lessee. Operators are required to install curbs, gutters, drip pans, and drains on platform and rig deck areas in a manner necessary to collect all contaminants and debris not authorized for discharge. The rules also explicitly prohibit the disposal of equipment, cables, chains, containers, or other materials into offshore waters. Portable equipment, spools or reels, drums, pallets, and other loose items weighing 18 kg or more must be marked in a durable manner with the owner's name prior to use or transport over offshore waters. Smaller objects must be stored in a marked container when not in use. Operational discharges such as produced water and drilling muds and cuttings are regulated by the USEPA through the NPDES program.

F. MMS Inspection Program: The MMS inspection program in theGOM is directed by the OCS Regional Office in New Orleans, Louisiana, and the four district offices and two subdistrict offices that provide day-to-day review and inspection of oil and gas operations. The MMS conducts onsite inspections to assure compliance with lease terms, NTL's, and approved plans, and to assure that safety and pollution-prevention requirements of regulations are met. These inspections involve items of safety and environmental concern. If an operator is found in violation of a safety or environmental requirement, a citation is issued requiring that it be fixed within 7 days.

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